

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A[[n]] hybrid protein consisting essentially of:
~~the fusion of an~~ ABC transporter membrane protein, ~~with~~
a spacer, and
an ATP-sensitive potassium ion channel from the Kir family ion channel which is not
naturally coupled to said ABC transporter membrane protein,
wherein said spacer is between said ABC transporter membrane protein and said
ATP-sensitive potassium channel, and
wherein said membrane protein, spacer, and potassium channel are functionally
coupled so that ligand binding to the ABC transporter membrane protein transduces a signal
to the potassium channel that produces an electrical signal.

Claim 2 (Cancelled).

Claim 3 (Currently Amended): The hybrid protein of claim [[2]] 1, wherein said
spacer consists of six glycine or ten glutamine residues.

Claim 4 (Withdrawn): The hybrid protein of claim 1, which comprises a tag, to
facilitate the detection and/or the purification of said hybrid protein.

Claim 5 (Withdrawn): The hybrid protein of claim 1, wherein said membrane protein
is a receptor.

Claim 6 (Withdrawn): The hybrid protein of claim 5, wherein said receptor is an hormone receptor.

Claim 7 (Withdrawn): The hybrid protein of claim 6, wherein said hormone receptor is the M2 muscarinic receptor.

Claim 8 (Withdrawn): The hybrid protein of claim 6, wherein said hormone receptor is the $\beta 2$ adrenergic receptor.

Claim 9 (Withdrawn): The hybrid protein of claim 5, wherein said receptor is a receptor for a pollutant/contaminant.

Claim 10 (Withdrawn): The hybrid protein of claim 5, wherein said receptor is an olfactive receptor.

Claim 11-12 (Cancelled).

Claim 13 (Currently Amended): The hybrid protein of claim [[12]] 1, wherein said ABC transporter is from the MRP class.

Claim 14 (Previously Presented): The hybrid protein of claim 13, wherein said ABC transporter is CFTR.

Claim 15 (Previously Presented): The hybrid protein of claim 13, wherein said ABC transporter is MRP1.

Claim 16 (Previously Presented): The hybrid protein of claim 13, wherein said ABC transporter is YCF1.

Claim 17 (Cancelled).

Claim 18 (Previously Presented): The hybrid protein of claim [[12]] 1, wherein said ABC transporter is Mdr1.

Claim 19-23 (Cancelled).

Claim 24 (Currently Amended): The hybrid protein of claim [[23]] 1, wherein said ATP-sensitive potassium channel is Kir6.2.

Claim 25 (Currently Amended): The hybrid protein of claim 24, which is any one of SEQ ID NOS: 1 to 11.

Claim 26 (Withdrawn): The hybrid protein of claim 1, wherein said ion channel is a voltage dependent channel.

Claim 27 (Withdrawn): The hybrid protein of claim 26, wherein said voltage dependent channel is from the Kv family.

Claim 28 (Withdrawn): The hybrid protein of claim 1, wherein said ion channel is a mechanosensitive channel.

Claim 29 (Withdrawn): The hybrid protein of claim 28, wherein said mechanosensitive channel is MscL.

Claim 30 (Previously Presented): A polynucleotide encoding the hybrid protein of claim 1.

Claim 31 (Previously Presented): A polynucleotide encoding the hybrid protein of claim 25.

Claim 32 (Currently Amended): A primer ~~able to amplify the polynucleotide of claim 25~~, which is selected from the group consisting of ~~[[is]]~~ SEQ ID NOS: 13 to 16, ~~[[and]]~~ 21, and 22.

Claim 33 (Previously Presented): A recombinant vector comprising the polynucleotide of claim 30.

Claim 34 (Currently Amended): ~~[[an]]~~ A host cell expressing the hybrid protein of claim 1.

Claim 35 (Currently Amended): An electrical sensor comprising:
the hybrid protein of claim 1, and
a membrane,
wherein said hybrid protein is incorporated in ~~[[a]]~~ the membrane to form an electrical
sensor.

Claim 36 (Withdrawn): A method for the screening of an agonist of a membrane protein, comprising ~~the step of~~:

- bringing a drug to test in contact with the electrical sensor of claim 35,
- measuring the resulting electrical signal by appropriate means, and
- selecting the drugs which induce an electrical signal.

Claim 37 (Withdrawn): A method for the screening of an antagonist of a membrane protein, comprising ~~the step of~~:

- bringing a drug to test in contact with the electrical sensor of claim 35, and with a ligand/substrate of said membrane protein,
- measuring the resulting electrical signal by appropriate means, and
- selecting the drugs which block the electrical signal induced by said ligand/substrate.

Claim 38 (Withdrawn): The method of claim 36, wherein said electrical sensor comprises ~~[[an]] a hybrid protein comprising MRP1 according to claim 15,~~ to screen anticancer drugs or multidrug reversing agents.

Claim 39 (Withdrawn): The method of claim 37, wherein said electrical sensor comprises ~~[[an]] a hybrid protein comprising MRP1 according to claim 15,~~ to screen anticancer drugs or multidrug reversing agents

Claim 40 (Withdrawn): The method of claim 36, wherein said electrical sensor comprises ~~[[an]] a hybrid protein comprising SUR according to claim 17,~~ to screen antidiabetic, antiischemic or antihypertensive drugs.

Claim 41 (Withdrawn): The method of claim 37, wherein said electrical sensor comprises ~~[[an]] a hybrid protein comprising SUR according to claim 17,~~ to screen antidiabetic, antiischemic or antihypertensive drugs.

Claim 42 (Withdrawn): A method for the detection of a contaminant/pollutant, comprising ~~the step of:~~

- bringing a sample to be tested in contact with the electrical sensor of claim 35,
- measuring the resulting electrical signal by appropriate means, and
- detecting the presence of said contaminant/pollutant in said sample.

Claim 43 (Withdrawn): The method of claim 42, wherein said electrical sensor comprises ~~[[an]] a hybrid protein comprises YCF1 according to claim 16,~~ to detect heavy metals such as nickel, cadmium, arsenite and mercury.

Claim 44 (Withdrawn): A method for assaying the activity of membrane protein, comprising ~~the step of:~~

- bringing a ligand/substrate of said membrane protein in contact with the electrical sensor of claim 35, and
- measuring the resulting electrical signal by appropriate means.

Claim 45 (Currently Amended): A kit for the screening of an ~~agonist/antagonist~~
agonist or antagonist, or both, of a membrane protein comprising ~~at least~~ the electrical sensor
of claim 35.

Claim 46 (Currently Amended): A kit for the detection of a ~~contaminant/pollutant~~
contaminant or a pollutant, or both, comprising ~~at least~~ the electrical sensor of claim 35.